

Taxon: Hoodia officinalis	Family: Apocynaceae
Common Name(s): hoodia	Synonym(s): Hoodia delaetiana (Dinter) Plowes Trichocaulon delaetianum Dinter Trichocaulon officinale N. E. Br.

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 7 May 2015
WRA Score: -2.0	Designation: L	Rating: Low Risk

Keywords: Succulent, Spiny, Medicinal, Rarely Seeds, Wind-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	n
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	n
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	n
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	n
401	Produces spines, thorns or burrs	y=1, n=0	y
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle		

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed		
603	Hybridizes naturally	y=1, n=-1	y
604	Self-compatible or apomictic		
605	Requires specialist pollinators		
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)		
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m ²)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	y

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Court, D. 2000. Succulent Flora of Southern Africa. Revised Edition. A.A. Balkema, Rotterdam, Netherlands	No evidence

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed 7 May 2015]	"Native: AFRICA Southern Africa: Namibia [s.]; South Africa - Free State [w.], Northern Cape"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed 7 May 2015]	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Loots, S. 2005. Red Data Book of Namibian plants. Southern African Botanical Diversity Network Report No. 38. SABONET, Pretoria and Windhoek	"Hoodia officinalis (N.E.Br.) Plowes subsp. delaetiana (Dinter) Bruyns" ... "Habitat: Lower mountain slopes and rocky outcrops (WIND, 2002); 300–500 m."
	Hübner, F. & Tränkle, U. 2014. Asclepidarium. http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	"Just as H. pedicellata. H. officinalis is very sensitive to accumulated heat and full sunshine. The shoot apexes get scorched and dry up. Through the years these shoot apexes continue to die back more and more, thus increasing the risk of rot and decay."

Qsn #	Question	Answer
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	"Most of these species grow in areas of Africa where winters are dry, periods of rainfall are short & the plants adapt by becoming dormant & losing roots. Here in Hawaii winters are the most rainy season, rain occurs frequently throughout the year & periods of prolonged wet soil conditions are encountered. Last summer here was also very wet & wet soil conditions persisted for months. When these plants are dormant they become highly susceptible to bacterial & fungal rot, mites and mite transmitted diseases."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed 7 May 2015]	"Native: AFRICA Southern Africa: Namibia [s.]; South Africa - Free State [w.], Northern Cape"

205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	Notes
	Hübner, F. & Tränkle, U. 2014. Asclepidarium. http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	"H. officinalis is rare in collections, the subspecies delaetiana even more so. Seed or even plant specimens are almost unobtainable."

301	Naturalized beyond native range	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	Wagner, W.L., Herbst, D.R. & Lorence, D.H. 2015. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm . [Accessed 7 May 2015]	No evidence

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

Qsn #	Question	Answer
303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
305	Congeneric weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
401	Produces spines, thorns or burrs	y
	Source(s)	Notes
	Court, D. 2000. Succulent Flora of Southern Africa. Revised Edition. A.A. Balkema, Rotterdam, Netherlands	"The spiny stems are 150-300 mm in height, with 17-22 rows of tubercles, the brown spines up to 6 mm long."
402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	Unknown
403	Parasitic	n
	Source(s)	Notes
	Hübner, F. & Tränkle, U. 2014. Asclepidarium. http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	"Plant: small shrub up to 30 by 50 cm tall, frequently smaller, branching out from the base, stems grey-green and erect, up to 50 cm tall and 3.5 to 6.5 cm wide. Rows: tubercles set up in rows of 17 22, each ending in a dark brown 6 mm long spine." [No evidence. Apocynaceae]
404	Unpalatable to grazing animals	
	Source(s)	Notes
	National Botanical Research Institute. 2011. Hoodia in Namibia. NBRI, Windhoek, Namibia	[Palatable to humans, so possibly also palatable to animals, but spines may deter browsing] "H. officinalis subsp. officinalis is said to be the sweetest-tasting of the Hoodias, and is well-known among the people in the South."

Qsn #	Question	Answer
	Tibe, O., Modise, D. M., & Mogotsi, K. K. (2008). Potential for domestication and commercialization of Hoodia and Opuntia species in Botswana. African Journal of Biotechnology, 7(9): 1199-1203	[Possibly unpalatable] "There is no evidence that the Hoodia species has ever been used as livestock forage and fodder. Its spiny appearance may act as a deterrent to being eaten by animals."

405	Toxic to animals	n
	Source(s)	Notes
	National Botanical Research Institute. 2011. Hoodia in Namibia. NBRI, Windhoek, Namibia	[Presumably non-toxic to humans & animals] "H. officinalis subsp. officinalis is said to be the sweetest-tasting of the Hoodias, and is well-known among the people in the South."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	[Affected by widespread pests & diseases in the Hawaiian Islands] "When these plants are dormant they become highly susceptible to bacterial & fungal rot, mites & mite transmitted diseases." ..."Approximately 1000 seedlings & cuttings of various Hoodia species (H. juttae, H. gordonii, H. macrantha, H. parviflora & H. pilifera) & Hoodiopsis triebneri have been grown in containers outdoors or planted directly in the ground for field trials at our site in Naalehu over the past three years. Virtually all of these have contracted black spot disease, a syndrome that apparently results from infestations with the false spider mite Brevipalpus phoenicis during wet weather conditions. The mite is present throughout Hawaii & has many host species. The permanent black lesions & scarring characteristic of the disease may result from the bite of the mite or a self limiting anthraconose fungus infection transmitted by the mites. This is still under investigation. Black spot disease weakens the plants & severely stunts growth of the affected shoots. If mite infestations are untreated the disease usually kills the plants. All species in this group except Caralluma & some Orbea spp. & Huernia spp. are susceptible to black spot disease. Bacterial soft rot is a devastating disease of this entire group, & also most prevalent during wet weather conditions. It is apparently caused by Erwinia bacteria (taxonomy unsettled) beginning as a root infection & spreading rapidly throughout the vascular system of the plant. Particularly in the swarming phase of growth the bacteria release enzymes that degrade the cell walls & result in the complete liquefaction of the internal tissues & collapse of the plant in 1- 2 days after the infection is first noticed. In Hoodia species the infections usually spread very rapidly & kill the entire plant. In Hoodiopsis infections tend to be walled off in the affected shoots, which may drop off & reroot as new plants."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes

Qsn #	Question	Answer
	National Botanical Research Institute. 2011. Hoodia in Namibia. NBRI, Windhoek, Namibia	[No evidence] "H. officinalis subsp. officinalis is said to be the sweetest-tasting of the Hoodias, and is well-known among the people in the South."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Loots, S. 2005. Red Data Book of Namibian plants. Southern African Botanical Diversity Network Report No. 38. SABONET, Pretoria and Windhoek	[No evidence. Unlikely due to succulent habit & sparsely vegetated habitat] "Spiny succulent, up to 400 mm high. Stems several, erect to sprawling, 40-70 mm thick, with 1-23 rows of vertically arranged, spine-tipped tubercles." ... "Habitat: Lower mountain slopes and rocky outcrops (WIND, 2002); 300-500 m."

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	LLIFLE. 2015. Hoodia officinalis. http://www.llifle.com/Encyclopedia/SUCCULENTS/Family/Asclepiadaceae/25797/Hoodia_officinalis . [Accessed 7 May 2015]	"In the summer months they will grow well in full sun or partial shade and tolerate heavy rain, but will be just as happy if the season is dry. "
	Hübner, F. & Tränkle, U. 2014. Asclepidarium. http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	"Just as H. pedicellata. H. officinalis is very sensitive to accumulated heat and full sunshine. The shoot apexes get scorched and dry up. Through the years these shoot apexes continue to die back more and more, thus increasing the risk of rot and decay."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	n
	Source(s)	Notes
	Loots, S. 2005. Red Data Book of Namibian plants. Southern African Botanical Diversity Network Report No. 38. SABONET, Pretoria and Windhoek	"Lower mountain slopes and rocky outcrops (WIND, 2002); 300–500 m. Threats: Restricted range."
	LLIFLE. 2015. Hoodia officinalis. http://www.llifle.com/Encyclopedia/SUCCULENTS/Family/Asclepiadaceae/25797/Hoodia_officinalis . [Accessed 7 May 2015]	"Since roots are quite shallow, a gritty, very free-draining compost with extra perlite or pumiceis suitable, and clay pots help the plants to dry out between watering. "

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Hübner, F. & Tränkle, U. 2014. Asclepidarium. http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	"Plant: small shrub up to 30 by 50 cm tall, frequently smaller, branching out from the base, stems grey-green and erect, up to 50 cm tall and 3.5 to 6.5 cm wide. Rows: tubercles set up in rows of 17-22, each ending in a dark brown 6 mm long spine."

412	Forms dense thickets	n
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Qsn #	Question	Answer
	Source(s)	Notes
	National Botanical Research Institute. 2011. Hoodia in Namibia. NBRI, Windhoek, Namibia	"H. officinalis subsp. delaetiana is restricted to the Sperrgebiet whilst H. officinalis subsp. officinalis is widespread in the South."
	Loots, S. 2005. Red Data Book of Namibian plants. Southern African Botanical Diversity Network Report No. 38. SABONET, Pretoria and Windhoek	"Habitat: Lower mountain slopes and rocky outcrops (WIND, 2002); 300–500 m."

501	Aquatic	n
	Source(s)	Notes
	Hübner, F. & Tränkle, U. 2014. Asclepidarium. http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	[Terrestrial] " small shrub up to 30 by 50 cm tall, frequently smaller, branching out from the base, stems grey-green and erect, up to 50 cm tall and 3.5 to 6.5 cm wide."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed 7 May 2015]	"Family: Apocynaceae subfamily: Asclepiadoideae tribe: Ceropegieae subtribe: Stapeliinae. Also placed in: Asclepiadaceae"

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed 7 May 2015]	"Family: Apocynaceae subfamily: Asclepiadoideae tribe: Ceropegieae subtribe: Stapeliinae. Also placed in: Asclepiadaceae"

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Hübner, F. & Tränkle, U. 2014. Asclepidarium. http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	[No evidence] " small shrub up to 30 by 50 cm tall, frequently smaller, branching out from the base, stems grey-green and erect, up to 50 cm tall and 3.5 to 6.5 cm wide. Rows: tubercles set up in rows of 17-22, each ending in a dark brown 6 mm long spine."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Loots, S. 2005. Red Data Book of Namibian plants. Southern African Botanical Diversity Network Report No. 38. SABONET, Pretoria and Windhoek	"Hoodia officinalis (N.E.Br.) Plowes subsp. delaetiana (Dinter) Bruyns" ... "Threats: Restricted range but no real threats could be confirmed; illegal harvesting may become a potential future threat."

Qsn #	Question	Answer
	Victor, J.E. & Powell, E. 2009. <i>Hoodia officinalis</i> (N.E.Br.) Plowes subsp. <i>officinalis</i> . National Assessment: Red List of South African Plants version 2014.1. http://redlist.sanbi.org/species.php?species=2705-21 . [Accessed 7 May 2015]	"Threatened by harvesting as is misidentified as <i>Hoodia gordonii</i> ."

602	Produces viable seed	
	Source(s)	Notes
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	[No seeds observed in Hawaii] "The smaller flowered, unscented <i>Hoodia</i> species have bloomed here but not produced seeds. The pollinators for these are unknown and may not be present."
	Hübner, F. & Tränkle, U. 2014. <i>Asclepidarium</i> . http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	[Yes, but rarely, if ever, in cultivation] " <i>H. officinalis</i> is rare in collections, the subspecies <i>delaetiana</i> even more so. Seed or even plant specimens are almost unobtainable."

603	Hybridizes naturally	y
	Source(s)	Notes
	Albers, F. & Meve, U. (eds.). 2002. <i>Illustrated Handbook of Succulent Plants: Asclepiadaceae</i> . Springer Science & Business Media, Berlin - Heidelberg - New York	"Natural hybrids have been reported with species of the genus <i>Stapelia</i> (= x <i>Tromostapelia</i>) as well as the combination <i>Tromotriche ruschiana</i> x <i>Hoodia officinalis</i> ssp. <i>delaetiana</i> ."

604	Self-compatible or apomictic	
	Source(s)	Notes
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	"Observations suggest that these <i>Hoodias</i> are self-sterile and that pollination by the same or related species is required."

605	Requires specialist pollinators	
	Source(s)	Notes
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	"The smaller flowered, unscented <i>Hoodia</i> species have bloomed here but not produced seeds. The pollinators for these are unknown and may not be present."
	Hübner, F. & Tränkle, U. 2014. <i>Asclepidarium</i> . http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	[Possibly fly-pollinated, but weak odor, and difficulty at hand-pollination, suggest more specialized pollinators may be required to produce viable seed] " <i>H. officinalis</i> is rare in collections, the subspecies <i>delaetiana</i> even more so. Seed or even plant specimens are almost unobtainable. Hand-pollination is very difficult and only successful if a certain narrow angle between pollinarium and feeding duct is maintained. Spontaneous frutification has not been noted, neither have hybrids occurred." ... "The small flowers emit only a very weak kind of unpleasant odour."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes

Qsn #	Question	Answer
	LLIFLE. 2015. <i>Hoodia officinalis</i> . http://www.llifle.com/Encyclopedia/SUCCULENTS/Family/Asclepiadaceae/25797/Hoodia_officialis . [Accessed 7 May 2015]	"Propagation: Propagation is done mainly from seed. Cuttings are not really an option, as the severed ends very rarely form a callus from where roots will eventually form."
	Hall, H. 1953. Hoodias. <i>The Cactus and Succulent Journal of Great Britain</i> 15(3): 68-69	[Generic description] "It seems an impossible task to propagate them by cuttings, and I have never seen root formation upon branches broken off by animals, etc., and which may have been lying on the soil for a year or more. One would imagine that a plant with 30-40 branches from the base would have a few supplementary roots from some of them, but the root system appears to be confined to the original central stem."

607	Minimum generative time (years)	
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	Unknown. Other <i>Hoodia</i> species reach reproductive maturity in 3-5+ years from seed

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	Hübner, F. & Tränkle, U. 2014. <i>Asclepidarium</i> . http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	"Seed or even plant specimens are almost unobtainable. Hand-pollination is very difficult and only successful if a certain narrow angle between pollinarium and feeding duct is maintained."
	WRA Specialist. 2015. Personal Communication	Unlikely, but possibly if hairs on seeds aid in adherence to clothing, or mud on shoes or equipment. However, seeds rarely, if ever produced in cultivation

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Oyen, L.P.A., 2013. <i>Hoodia gordonii</i> (Masson) Sweet ex Decne. In: Schmelzer, G.H. & Gurib-Fakim, A. (Editors). <i>Prota</i> 11(2): Medicinal plants/Plantes médicinales 2. PROTA, Wageningen, Netherlands	" <i>Hoodia officinalis</i> is used to treat haemorrhoids. It is occasionally cultivated as ornamental by succulent enthusiasts, but pollination is difficult and seed hard to obtain."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Hübner, F. & Tränkle, U. 2014. <i>Asclepidarium</i> . http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	[Highly unlikely given difficulty in obtaining seeds in cultivation] "Seed or even plant specimens are almost unobtainable. Hand-pollination is very difficult and only successful if a certain narrow angle between pollinarium and feeding duct is maintained."
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	[Highly unlikely given difficulty in obtaining seeds in cultivation] "The smaller flowered, unscented <i>Hoodia</i> species have bloomed here but not produced seeds. The pollinators for these are unknown and may not be present."

704	Propagules adapted to wind dispersal	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Hübner, F. & Tränkle, U. 2014. Asclepidarium. http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	[Presumably Yes. When produced, but rare in cultivation] "Fruits: follicles, between 115 and 125 mm long; between 164 and 292 seed per pair." ... "Seed or even plant specimens are almost unobtainable. Hand-pollination is very difficult and only successful if a certain narrow angle between pollinarium and feeding duct is maintained. Spontaneous frutification has not been noted, neither have hybrids occurred."

705	Propagules water dispersed	n
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	Unlikely source of secondary dispersal. Produces wind-dispersed seeds within native range, but rarely, if ever, produces seeds in cultivation.

706	Propagules bird dispersed	n
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	No evidence. Seeds, if produced, are adapted for wind-dispersal

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	Unknown. Adapted for wind dispersal, but hairs could possibly allow seeds, if produced, to adhere to fur or mud. Rarely, if ever, produces seed in cultivation

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Gordon, D. R., Mitterdorfer, B., Pheloung, P. C., Ansari, S., Buddenhagen, C., Chimera, C., ... & Williams, P. A. 2010). Guidance for addressing the Australian Weed Risk Assessment questions. <i>Plant Protection Quarterly</i> , 25(2): 56-74	"Answer 'no' where the taxon is unlikely to be eaten by animals or if seeds are not viable following passage through the gut." [Seeds, if produced, possess adaptations for wind dispersal]

801	Prolific seed production (>1000/m ²)	n
	Source(s)	Notes
	Hübner, F. & Tränkle, U. 2014. Asclepidarium. http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	[Not in cultivation] "Fruits: follicles, between 115 and 125 mm long; between 164 and 292 seed per pair." ... "Seed or even plant specimens are almost unobtainable. Hand-pollination is very difficult and only successful if a certain narrow angle between pollinarium and feeding duct is maintained. Spontaneous frutification has not been noted..." ... "If the weather is favourable, <i>H. officinalis</i> flowers twice in early summer and in late autumn without any difficulty, but rarely in abundance."

Qsn #	Question	Answer
802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Hübner, F. & Tränkle, U. 2014. Asclepidarium. http://www.asclepidarium.de/English/index_e.htm . [Accessed 7 May 2015]	[Unknown, but seeds rarely, if ever, produced in cultivation] "Seed or even plant specimens are almost unobtainable. Hand-pollination is very difficult and only successful if a certain narrow angle between pollinarium and feeding duct is maintained. Spontaneous frutification has not been noted..."
	Royal Botanic Gardens Kew. 2008. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ . [Accessed 7 May 2015]	Unknown. Seeds of other Hoodia species have orthodox storage

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	Loots, S. 2005. Red Data Book of Namibian plants. Southern African Botanical Diversity Network Report No. 38. SABONET, Pretoria and Windhoek	[Unknown. Plants presumably do not tolerate or recover well from damage to or removal of plant parts] "Threats: Restricted range but no real threats could be confirmed; illegal harvesting may become a potential future threat."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y
	Source(s)	Notes
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	[Members of genus affected by widespread pests & diseases] "Approximately 1000 seedlings & cuttings of various Hoodia species (<i>H. juttae</i> , <i>H. gordonii</i> , <i>H. macrantha</i> , <i>H. parviflora</i> & <i>H. pilifera</i>) & <i>Hoodiopsis triebneri</i> have been grown in containers outdoors or planted directly in the ground for field trials at our site in Naalehu over the past three years. Virtually all of these have contracted black spot disease, a syndrome that apparently results from infestations with the false spider mite <i>Brevipalpus phoenicis</i> during wet weather conditions. The mite is present throughout Hawaii & has many host species. The permanent black lesions & scarring characteristic of the disease may result from the bite of the mite or a self limiting anthraconose fungus infection transmitted by the mites."

Summary of Risk Traits:

High Risk / Undesirable Traits

- Able to grow in regions with tropical climates
- Spiny
- Reproduces by wind-dispersed seeds (but limited seed production in cultivation)
- May be able to produce interspecific & intergeneric hybrids
- Limited ecological information may reduce accuracy of risk prediction

Low Risk Traits

- No reports of invasiveness or naturalization, but introduction outside native range appears to be limited
- Valuable medicinal plant
- Susceptibility to bacterial and fungal rot, mites and mite transmitted diseases may limit ability to escape & spread in the Hawaiian Islands
- Rarely, if ever, produces seed in cultivation
- Possibly self-incompatible
- Possibly requires specialized pollinators
- Not reported to spread vegetatively